

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Apparatus for Aerating Water

We, SULZER FRÈRES, SOCIÉTÉ ANONYME, a Company organised under the Laws of Switzerland, of Winterthur, Switzerland, do hereby declare the invention, for which we pray 5 that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to apparatus for 10 aerating water.

It is well known that the corrosion of the material of pipes through which water is carried is to a large extent dependent, inter alia, upon the oxygen content of the water. 15 Various methods of aerating water are known, whereby the amount of air or oxygen necessary to preserve the materials of the water pipes and their fittings from possible damage is supplied to the water. These known methods 20 are accompanied by the disadvantage that severe damage may be caused in certain circumstances by water deficient in oxygen in the water supply pipes upstream of the point of introduction of the air. In such cases these 25 supply pipes are unprotected and in addition the water may be polluted by substances dissolved from pipe and tank walls, which may have an adverse effect on its use as drinking water, for example, and may also lead to 30 sludge deposits at points where this is undesirable.

These disadvantages can be obviated in 35 apparatus for aerating water embodying the present invention, which comprises a water supply pipe leading to the installation and an air outlet device disposed in the interior of the water supply pipe in a part thereof the wetted surface of which consists of a material not susceptible to attack by water.

The apparatus advantageously comprises an 40 air-delivering machine such as a compressor which delivers a controllable quantity of air, filtered if desired, through a pipe provided with a water separator to an air outlet device 45 disposed in a water supply pipe leading to a storage tank.

The invention may be performed in various

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ways, and a water supply installation equipped with one form of apparatus embodying the invention will now be described by way of example with reference to the accompanying drawing which is a diagrammatic elevation of the installation, partly in section.

Referring to the drawing, the installation includes a storage tank 1, which may be made of any desired material, and into which leads a water supply pipe 2 which in the example illustrated communicates with the ground water. The supply pipe is made of corrosion-proof or erosion-proof metallic material such as non-rusting steel (e.g. austenitic chrome nickel steel), or of stoneware, or at least that part of its surface which comes into contact with the water is coated with a material not susceptible to attack by water such as a synthetic resin. There is also an air-delivering machine 3, for example a compressor, which draws in air from the atmosphere through a filter 4 and an intake pipe 5 provided with a non-return valve 6. The non-return valve prevents the cooling water hereinafter referred to from entering the filter when the delivering machine is stopped. The air compressed in this machine is fed through a pipe 7 provided with a water separator 8 of conventional construction to a distributor 9, for example a header. From the distributor individual pipes 11 each provided with a shut-off valve 10 branch off, each leading to an air outlet device 12 disposed in the interior of the water supply pipe 2.

The air outlet device 12 comprises a holder carrying diffuser candles 13, which consist of porous material such as sintered ceramic material ("cermet") or graphite and from which the air supplied can emerge in the smallest possible bubbles. The smaller the pores of the material of these diffuser candles, and the smaller the air bubbles emerging therefrom, the better and more complete is the absorption of the air in the water above the diffuser candles. In the present example twelve diffuser candles are used, which are staggered and attached to the holder in

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different planes. This spacing of the diffuser candles means that no unnecessary resistance is offered to the ground water flowing through to the storage tank. Instead of there being only one diffuser candle to each air supply pipe 11 there may be two or more. The candle or group of candles connected to each air supply pipe can be put into or out of operation independently of the other candles or groups of candles. The diffuser candles are preferably so disposed that there is a head of water of at least 6 to 10 feet from the candles up to the bottom valve at the intake of a pump which draws from the storage tank.

Although this arrangement has proved advantageous, a different arrangement of the air outlet device is also possible. Thus instead of diffuser candles it is possible to use filter cloths or screens or porous plates, for example of sintered ceramic material, or nozzle bodies or boxes made from perforated sheets, or double cylinders of rust-proof material the cavities of which are filled with shavings or wool of rust-proof material. Such rust-proof material may be, for example, non-rusting steel (e.g. austenitic chrome nickel steel). In principle, any arrangement not offering too great a resistance to the passage of air and yet allowing the air to pass in small separate bubbles is suitable. The holder of the diffuser candles, or a part thereof, is adapted to be withdrawn from the water supply pipe and from the storage tank, together with the diffuser candles fastened thereto, by means of a rod 14 or a cable. This is necessary to enable the filter candles, which become dirty during operation, to be easily cleaned. Measures may also be taken so that a single diffuser candle—or a group of diffuser candles can be withdrawn from the water supply pipe for cleaning purposes without interrupting the operation of the other diffuser candles.

Water pumps 15 of conventional construction deliver the water, collected in the tank 1 and adequately provided with atmospheric oxygen by means of the above-described aeration apparatus, through a pipe 17 equipped with a shut-off valve 16 to consumer points (not shown). Sleeves 18 surround the driving shafts 19 of the driving motors (not shown) for the pumps.

The cooling water required for cooling the compressor 3 is branched off from the delivery pipe 17 through a cooling water pipe 20. This cooling water pipe is equipped with a shut-off valve, for example a solenoid-operated valve 21, a filter 22 and a regulating valve 23. The water separator 8 is provided with the trap 24 for water of condensation, from which the water collected therein is discharged through a pipe 25 into the storage tank 1. The distributor 9 is provided at a suitable point with a pressure gauge 26, which enables the pressure in the distributor to be ascertained whereby the load on the diffuser candles can be checked. An electric motor 27 drives the air-delivering machine 3. Operation of the air-delivering machine is advantageously made automatically dependent on the operation of the water pumps 15.

WHAT WE CLAIM IS:—

1. Apparatus for aerating water for the purpose of preventing damage to the materials of water supply installations, comprising a water supply pipe leading to the installation and an air outlet device disposed in the interior of the water supply pipe in a part thereof the wetted surface of which consists of a material not susceptible to attack by water.
2. Apparatus as claimed in Claim 1 which includes an air-delivering machine which delivers a controllable quantity of air through a pipe provided with a water separator to an air outlet device disposed in a water supply pipe leading to a storage tank.
3. Apparatus as claimed in Claim 2 in which an air filter and a non-return valve are provided in the air intake pipe of the air-delivering machine.
4. Apparatus as claimed in Claim 2 or Claim 3 in which the air outlet device is made of porous material and is removable from the water supply pipe.
5. Apparatus as claimed in any of Claims 2 to 4 in which a branch from a pipe delivering aerated water supplies cooling water to the air-delivering machine.
6. Apparatus for aerating water substantially as described with reference to the accompanying drawing.

KILBURN & STRODE,
Agents for the Applicants.

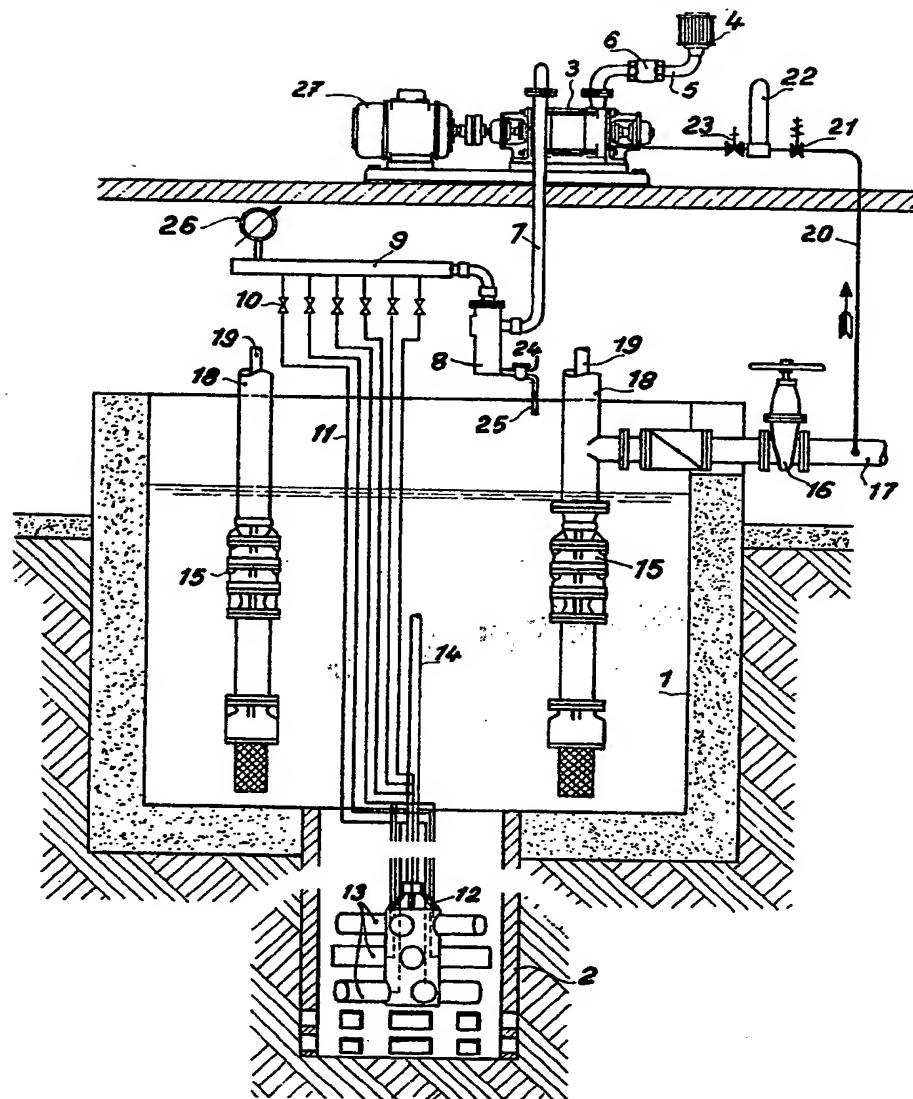
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1 SHEET

COMPLETE SPECIFICATION

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the Original on a reduced scale.*



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